

Medicare Spending for Older Adults Who Need Long-Term Services and Supports

Appendix: Methodology and Complete Results

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Section I. Introduction

The Long-Term Quality Alliance and the Roger C. Lipitz Center for Integrated Health Care at Johns Hopkins University partnered to examine the relationship between physical and cognitive impairment (i.e. “LTSS Need”) and Medicare utilization. This study uses the 2011 National Health and Aging Trends Study (NHATS), a nationally representative survey of Medicare beneficiaries age 65 and older.

This appendix describes in detail the methodology for the analysis and provides information regarding characteristics and healthcare utilization for the Medicare fee-for-service population studied. For a discussion of the study’s primary findings, please see the Research Brief that this appendix accompanies.

Section II. Defining the “LTSS Need” Population

Two definitions of “LTSS Need” were developed in this analysis. These definitions included both physical and cognitive impairment, and included all individuals not residing in nursing homes. We included nursing home residents as a separate category due to differences in the availability of data. The first, narrower definition of need in the community closely matches the HIPAA definition of disability, and included about 10 percent of the Medicare 65+ population (Table 1). The second, broader definition captured about 20 percent of the over age 65 Medicare population, and was included to address potential sample size concerns. As stated above, NHATS does not collect detailed information on physical and cognitive impairment data for nursing home residents, and results for this population are therefore reported separately.

Table 1: Population Size Estimates			
Category ¹	Population Size	Population Share	Sample Size
Full Medicare 65+ Population	36.4 million	100%	8,077
Narrow Definition of LTSS Need	3.5 million	9.9%	1,024
Broad Definition of LTSS Need	7.2 million	20.4%	1,897
Nursing Home Residents	1.1 million	3.1%	468

Source: 2011 National Health and Aging Trends Study

¹ This table includes all beneficiaries enrolled in fee-for-service Medicare as well as in Medicare Advantage plans.

Defining Physical Impairment

NHATS collects data on several kinds of everyday activities:

- Self-care activities: eating, getting cleaned up, using the toilet, and dressing
- Mobility-related activities: going outside one's home, getting around inside one's home, and getting out of bed
- Household activities: laundry, shopping for groceries or other personal items, making hot meals, handling bills and banking, and handling less common money matters
- Medical care activities: handling prescription medicines, managing doctor visits, and managing medical bills and insurance

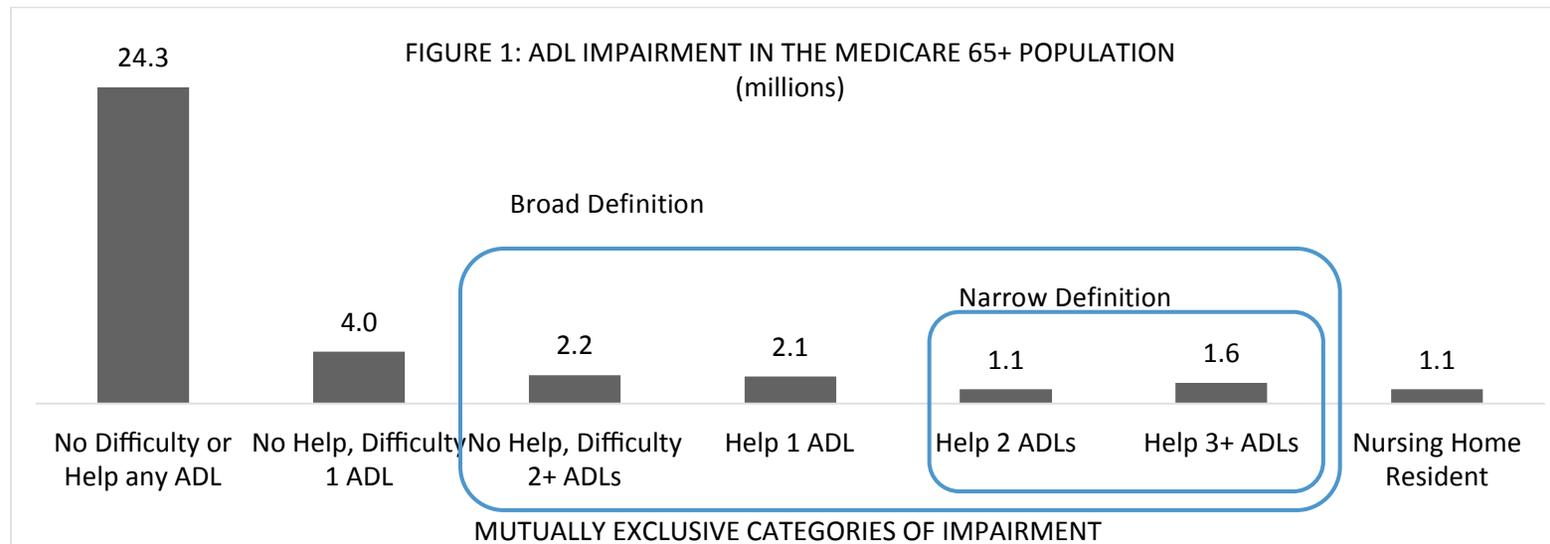
For each activity, NHATS describes the respondent's level of functioning as one of four levels:

- No limitation in the activity
- Accommodates any limitations with devices or by doing the activity less frequently, but does not report having any difficulty or receiving any help with the activity
- Has difficulty doing the activity alone, but does not receive help
- Receives help with the activity from another person

For this analysis, we used responses for five ADLs in the definition of LTSS need: eating, bathing, using the toilet, getting dressed, and transferring. These five activities are commonly used in state Medicaid eligibility assessments for nursing home and HCBS coverage, and are also part of most long-term care insurance benefit eligibility criteria.

In addition to defining the five ADLs for this analysis, it was also necessary to set a threshold level of limitation to constitute "LTSS Need." We considered setting the threshold at either "having difficulty" or "receiving help." Different thresholds have a substantial impact on the size of the population that is classified as having LTSS need. Ultimately, we created two different definitions, describing two different levels of ADL need. The narrow definition—which most closely mirrors the HIPAA definition of disability—set the threshold at "receiving help" for two or more ADLs. The broad definition set the threshold at "having difficulty" with two or more ADLs or "receiving help" with any ADL. Both definitions exclude nursing home residents, for whom assessment of detailed information regarding physical and cognitive impairment is not available. Estimates of the numbers of nursing home residents are reported separately.

Figure 1: ADL Impairment in the Medicare 65+ Population



Source: 2011 National Health and Aging Trends Study

Defining Severe Cognitive Impairment

Definitions of LTSS need generally include two components: physical impairment and cognitive impairment. Despite differences in thresholds and specific activities measured, the approach to assessing physical impairment in national surveys is relatively standard in the reliance on self- or proxy-reported information. Assessments of cognitive impairment, however, are much less standardized in national surveys which may rely on a combination of self- and proxy-reported information regarding physician diagnosis, performance tests of cognitive function, and proxy-reports regarding the symptoms and behaviors of dementia.

In order to meet the HIPAA definition of LTSS need on the basis of cognitive impairment, individuals must “require substantial supervision to protect such individual from threats to health and safety due to severe cognitive impairment.”² However, determining whether or not an individual requires supervision is an inherently subjective process. NHATS offers several measures that may be used to identify individuals with cognitive impairment, as follows.

² Health Insurance Portability and Accountability Act Of 1996, Subtitle C, Part I, Section 321, “Treatment of Long-Term Care Insurance.”

1. *The NHATS Composite Measure of “Probable Dementia”*

A composite measure of probable dementia has been developed for the National Health and Aging Trends Study (NHATS) on the basis of information reported by self- and proxy-respondents and cognitive tests of memory, orientation, and executive function. Study participants are classified as having probable dementia on the basis of a report of a doctor’s diagnosis of dementia or Alzheimer’s disease; a score indicating likely dementia on the AD8, a dementia screening instrument administered to proxy respondents,^{3,4} or impairment based on cognitive tests that evaluate memory, orientation, and executive function (with a score of ≥ 1.5 standard deviations below the mean in at least two domains). Using these criteria, classification into the categories of probable dementia or no dementia correspond well to a clinical diagnostic assessment.⁵

Based on this composite probable dementia variable, an estimated 3.5 million older adults living in the community have dementia—about 10 percent of the older adult population.

2. *A claims-based indicator of dementia*

For NHATS respondents enrolled in fee-for-service Medicare, a claims-based measure may be developed to identify beneficiaries who have received a diagnosis of Alzheimer’s and other dementias. However, the use of such a measure would substantially underestimate the population who meet a HIPAA level of need, due to the fact that dementia is underdiagnosed in practice.⁶

3. *Use IADL limitations as a proxy for severe cognitive impairment*

Another method for identifying individuals with severe cognitive impairment is to use the need for assistance with IADLs to distinguish a higher level of need within the “probable dementia” population—an analytical practice for which there is precedent in the LTSS literature.⁷ The relationship between IADL limitations and severity of cognitive impairment has also been explored directly, and found to be a valid proxy of severity.⁸

³ J Galvin, C Roe, C Xiong, and J Morris (2006) “Validity and reliability of the AD8 informant interview in dementia,” *Neurology* 67(11):1942-8.

⁴ J Galvin, C Roe, K Powlishta, et al. (2005) “The AD8: a brief informant interview to detect dementia,” *Neurology* 65(4):559-64.

⁵ J Kasper, V Freedman, and B Spillman (2013) “Classification of Persons by Dementia Status in the National Health and Aging Trends Study: Technical Paper #5,” Baltimore: Johns Hopkins University School of Public Health.

⁶ A Bradford et al. (2009) “Missed and Delayed Diagnosis of Dementia in Primary Care: Prevalence and Contributing Factors,” *Alzheimer Dis Assoc Disord* 23(4):306-314.

⁷ Komisar and Feder (2011) defined LTSS need as receiving receive hands-on or standby assistance from another person with at least 1 of 5 ADLs (bathing, dressing, eating, transferring from bed or chair, and using the toilet) or at least 3 of 5 IADLs (light housework, managing medications, managing money, preparing meals, and using the telephone). The criterion of needing assistance with 3 or more IADLs was

Other researchers have struggled to identify the population with severe cognitive impairment and proposed various solutions. The lack of concordance between survey responses, claims-based measures, and clinical measures of dementia is well documented.⁹ Furthermore, distinguishing between mild cognitive impairment and the kind of severe cognitive impairment that necessitates supervision is not straightforward.¹⁰

To examine a measure of LTSS need that reflects significant cognitive impairment, a summary measure was constructed for this analysis that combined the NHATS “probable dementia” measure with self- and proxy-reported information regarding receipt of help with self-care or household activities. Among the 3.5 million beneficiaries identified by this measure, we observed variability in the amount of assistance received (see Figure 2). Nearly one million of those identified as having probable dementia did not receive assistance with any ADLs or IADLs whereas 1.3 million older adults identified as having probable dementia received help with 2 or more ADLs. Consistent with Komisar and Feder (2011), we used a threshold for “severe cognitive impairment” as receiving help with 3 or more IADLs, or one or more ADLs. Using this definition, we identified 2.1 million older adults as having “severe cognitive impairment”, many of whom also met the threshold level of physical impairment for the definition of LTSS need.

included explicitly to identify people who needed care due to cognitive impairment.

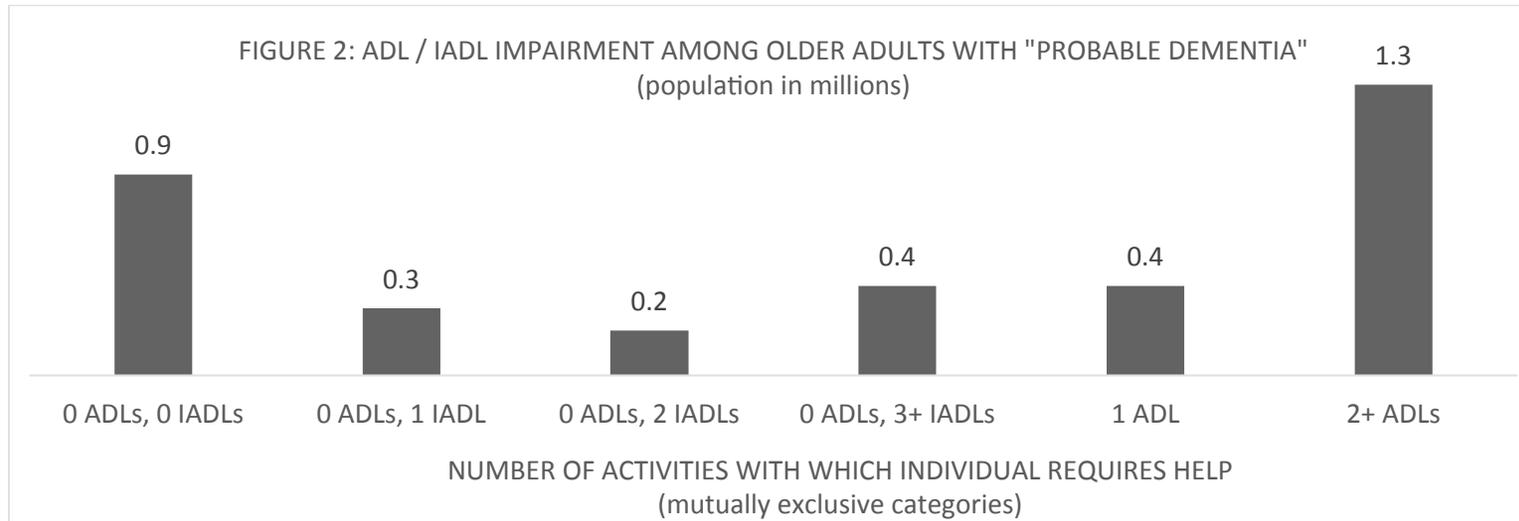
http://www.thescanfoundation.org/sites/default/files/Georgetown_Trnsfrming_Care.pdf

⁸ H Takechi et al. (2012) “Relative Preservation of Advanced Activities in Daily Living among Patients with Mild-to-Moderate Dementia in the Community and Overview of Support Provided by Family Caregivers,” *International Journal of Alzheimer’s Disease*; S Sikkes et al. (2013) “Assessment of instrumental activities of daily living in dementia,” *Journal of Geriatric Psychiatry and Neurology* 26(4):244-250.

⁹ T Ostbye et al. (2008) “Identification of Dementia: Agreement among National Survey Data, Medicare Claims, and Death Certificates,” *Health Services Research* 43(1): 313–326.

¹⁰ J Morris (2012) “Revised Criteria for Mild Cognitive Impairment May Compromise the Diagnosis of Alzheimer Disease Dementia,” *Arch Neurol* 69(6):700-708.

Figure 2: ADL / IADL Impairment Among Older Adults With "Probable Dementia"

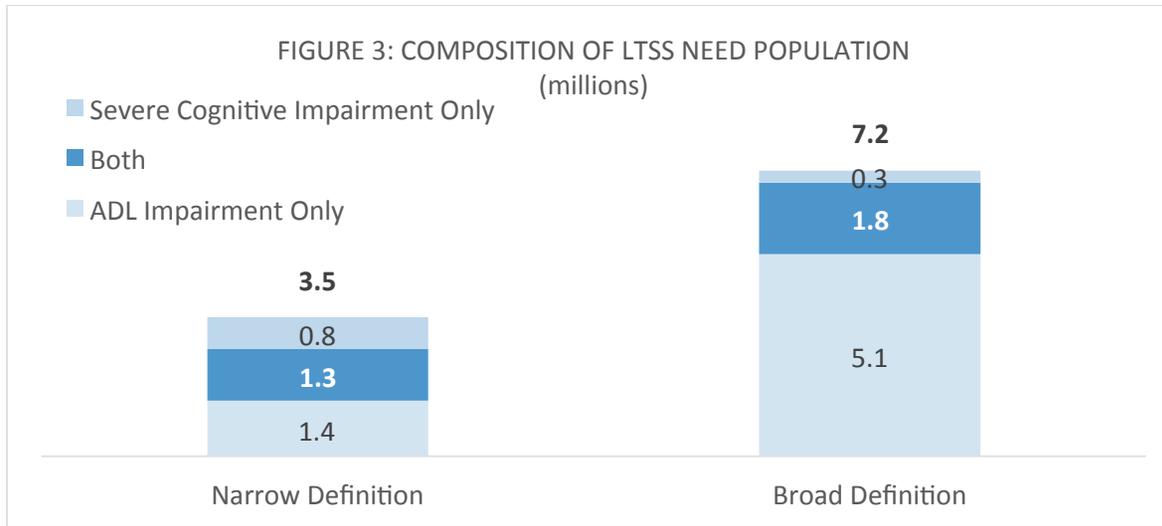


Source: 2011 National Health and Aging Trends Study

Size of the Population with LTSS Need

We applied the same definition of severe cognitive impairment in determining both the narrow and broad definitions of LTSS need. Only the physical impairment criteria differ, where the threshold is set at "receiving help with 2 or more ADLs" for the narrow definition, and "having difficulty with 2 or more ADLs OR receiving help with 1 or more ADLs" for the broad definition. Many people who meet the threshold for the physical impairment component of these definitions of LTSS need also meet the criteria for severe cognitive impairment. As Figure 3 illustrates, there is substantial overlap of these different components of need in each definition.

Figure 3: Composition of LTSS Need Population



Source: 2011 National Health and Aging Trends Study

Defining Medicaid Enrollment

About one-third of older adults living in the community who met our narrow definition of LTSS need were enrolled in both Medicare and Medicaid (i.e., are dually eligible). We considered the following sources of information:

1. The State Medicare Modernization Act File of Dual Eligibles (“State MMA File”)
2. Medicare enrollment data indicating if a state Medicaid program paid a beneficiary’s Medicare premiums (“State Buy-In”)
3. NHATS survey response (i.e., self-reported enrollment status)

For this analysis, we used the State MMA File to identify dual eligibles in the NHATS population file as it is recommended by CMS¹¹ and used by MEDPAC given greater granularity and timeliness relative to other data sources. We also included individuals who are not identified as duals through the MMA file but who have self-identified on the survey.

¹¹ Medicare-Medicaid Coordination Office, Centers for Medicare and Medicaid Services (2016) “Data Analysis Brief: Medicare-Medicaid Dual Enrollment from 2006 through 2015.” Available at: https://www.cms.gov/Medicare-Medicaid-Coordination/Medicare-and-Medicaid-Coordination/Medicare-Medicaid-Coordination-Office/Downloads/DualEnrollment_2006-2015.pdf

Defining Chronic Conditions

We incorporated a measure of “chronic condition” on the basis of 9 conditions that are included in the NHATS survey instrument. The NHATS survey asks respondents if a doctor ever told them they had: a heart attack or myocardial infarction; any heart disease including angina or congestive heart failure; high blood pressure or hypertension; arthritis (including osteo- or rheumatoid arthritis); osteoporosis or thinning of the bones; diabetes; lung disease such as emphysema, asthma, or chronic bronchitis; a stroke; and cancer.

NHATS survey data can be linked to the chronic condition warehouse (CCW) file for identification of chronic conditions for respondents enrolled in Medicare fee-for-service. We did not use the CCW to identify the presence of chronic conditions in the NHATS survey population because the warehouse file requires that the conditions appear in claims for several years before being recorded as “chronic” in the warehouse. Using this time factor would likely result in undercounting of chronic conditions in the NHATS population.

Section III: Population Descriptive Statistics

Tables 2 and 3 present key characteristics of the Medicare population available from NHATS: age, gender, number of chronic conditions, source of Medicare coverage, Medicaid coverage and income level, living arrangement, education, and residential setting. Table 2 presents descriptive statistics on the full Medicare population surveyed by NHATS—those enrolled in fee-for-service Medicare as well as those enrolled in Medicare Advantage. Table 3 presents the same information for Medicare fee-for-service beneficiaries, the population for which we use claims data to analyze utilization.

Only limited data is available on nursing home residents in NHATS. Nursing home residents’ data are excluded from other columns and are reported separately where available. Totals may not sum exactly due to rounding.

Table 2: Full Medicare 65+ Population Descriptive Statistics

Table 2: Full Medicare 65+ Population Descriptive Statistics ¹²						
Population Estimate, 1000's (Share)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	35,306	28,088	7,217	31,821	3,484	1,081
Age						
Average Age	75.3	74.4	78.6	74.6	81.3	84.0
65-74	18,676 (52.9%)	16,090 (57.3%)	2,586 (35.8%)	17,901 (56.3%)	775 (22.2%)	165 (15.3%)
75-79	6,730 (19.1%)	5,419 (19.3%)	1,311 (18.2%)	6,084 (19.1%)	646 (18.5%)	150 (13.9%)
80+	9,900 (28.0%)	6,580 (23.4%)	3,320 (46.0%)	7,836 (24.6%)	2,064 (59.2%)	765 (70.8%)
Gender						
Female	19,987 (56.6%)	15,350 (54.6%)	4,637 (64.3%)	17,608 (55.3%)	2,379 (68.3%)	788 (72.9%)
Male	15,318 (43.4%)	12,738 (45.4%)	2,580 (35.7%)	14,213 (44.7%)	1,105 (31.7%)	292 (27.0%)
Number of Chronic Conditions						
Average Number	2.0	1.9	2.7	2.0	2.7	No Data
0-1	12,463 (35.3%)	11,157 (39.7%)	1,306 (18.1%)	11,788 (37.0%)	675 (19.4%)	No Data
2	10,655 (30.2%)	8,687 (30.9%)	1,967 (27.3%)	9,782 (30.7%)	873 (25.1%)	No Data
3	7,751 (22.0%)	5,683 (20.2%)	2,068 (28.7%)	6,813 (21.4%)	937 (26.9%)	No Data
4+	4,437 (12.6%)	2,561 (9.1%)	1,876 (26.0%)	3,438 (10.8%)	999 (28.7%)	No Data
Medicare Coverage						
Fee-for-service Medicare	23,971 (67.9%)	18,986 (67.6%)	4,985 (69.1%)	21,449 (67.4%)	2,522 (72.4%)	874 (80.9%)
Medicare Advantage	11,335 (32.1%)	9,102 (32.4%)	2,232 (30.9%)	10,372 (32.6%)	962 (27.6%)	207 (19.1%)
Medicaid Coverage						
Enrolled in Medicaid	5,071 (14.4%)	2,840 (10.1%)	2,231 (30.9%)	3,812 (12.0%)	1,259 (36.1%)	793 (73.4%)
Full Medicaid	3,493 (9.9%)	1,797 (6.4%)	1,696 (23.5%)	2,477 (7.8%)	1,016 (29.2%)	No Data
Partial Medicaid	1,578 (4.5%)	1,043 (3.7%)	535 (7.4%)	1,335 (4.2%)	243 (7.0%)	No Data
No Medicaid	30,235 (85.6%)	25,249 (89.9%)	4,986 (69.1%)	28,010 (88.0%)	2,225 (63.9%)	287 (26.5%)
No Medicaid, <200% FPL	8,383 (23.7%)	6,423 (22.9%)	1,960 (27.2%)	7,360 (23.1%)	1,023 (29.4%)	No Data
No Medicaid, >200% FPL	21,852 (61.9%)	18,826 (67.0%)	3,026 (41.9%)	20,650 (64.9%)	1,202 (34.5%)	No Data

¹² This table includes results for all beneficiaries enrolled in fee-for-service Medicare (i.e., Original Medicare) as well as in Medicare Advantage plans. For characteristics of just the population enrolled in fee-for-service, see the next table.

Table 2: Full Medicare 65+ Population Descriptive Statistics ¹²						
Population Estimate, 1000's (Share)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Living Arrangement						
Alone	8,886 (25.2%)	7,410 (26.4%)	1,477 (20.5%)	8,391 (26.4%)	495 (14.2%)	No Data
Spouse Only	16,100 (45.6%)	13,666 (48.7%)	2,435 (33.7%)	15,151 (47.6%)	950 (27.3%)	No Data
With Others	8,369 (23.7%)	5,971 (21.3%)	2,398 (33.2%)	6,955 (21.9%)	1,414 (40.6%)	No Data
Residential Care Facility	1,951 (5.5%)	1,042 (3.7%)	908 (12.6%)	1,324 (4.2%)	626 (18.0%)	No Data
Education						
Less than high school	7,587 (21.5%)	5,227 (18.6%)	2,360 (32.7%)	6,252 (19.6%)	1,335 (38.3%)	No Data
High school only	9,627 (27.3%)	7,746 (27.6%)	1,881 (26.1%)	8,704 (27.4%)	923 (26.5%)	No Data
Some college or more	18,092 (51.2%)	15,115 (53.8%)	2,977 (41.2%)	16,866 (53.0%)	1,227 (35.2%)	No Data
Residential Setting						
Community	33,355 (94.5%)	27,046 (96.3%)	6,309 (87.4%)	30,497 (95.8%)	2,858 (82.0%)	No Data
Residential care facility	1,951 (5.5%)	1,042 (3.7%)	908 (12.6%)	1,324 (4.2%)	626 (18.0%)	No Data

Source: 2011 National Health and Aging Trends Study

Table 3: Fee-for-Service Medicare 65+ Population Descriptive Statistics

Table 3: Fee-for-Service Medicare 65+ Population Descriptive Statistics						
Population Estimate, 1000's (Share)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	23,971	18,986	4,985	21,449	2,522	874
Age						
Average	75.4	74.5	79.0	74.7	81.4	84.2
65-74	12,452 (51.9%)	10,784 (56.8%)	1,668 (33.5%)	11,898 (55.5%)	554 (22.0%)	126 (14.4%)
75-79	4,497 (18.8%)	3,602 (19.0%)	894 (17.9%)	4,028 (18.8%)	469 (18.6%)	122 (14.0%)
80+	7,022 (29.3%)	4,600 (24.2%)	2,422 (48.6%)	5,523 (25.7%)	1,499 (59.4%)	625 (71.5%)
Gender						
Female	13,321 (55.6%)	10,164 (53.5%)	3,157 (63.3%)	11,607 (54.1%)	1,714 (68.0%)	657 (75.2%)
Male	10,650 (44.4%)	8,822 (46.5%)	1,828 (36.7%)	9,842 (45.9%)	808 (32.0%)	216 (24.7%)
Number of Chronic Conditions						

Table 3: Fee-for-Service Medicare 65+ Population Descriptive Statistics						
Population Estimate, 1000's (Share)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Average	2.0	1.9	2.7	2.0	2.7	No Data
0-1	8,553 (35.7%)	7,628 (40.2%)	925 (18.6%)	8,058 (37.6%)	495 (19.6%)	No Data
2	7,092 (29.6%)	5,759 (30.3%)	1,334 (26.8%)	6,462 (30.1%)	631 (25.0%)	No Data
3	5,248 (21.9%)	3,833 (20.2%)	1,415 (28.4%)	4,562 (21.3%)	686 (27.2%)	No Data
4+	3,078 (12.8%)	1,767 (9.3%)	1,311 (26.3%)	2,367 (11.0%)	711 (28.2%)	No Data
Medicaid Coverage						
Enrolled in Medicaid	3,349 (14.0%)	1,807 (9.5%)	1,542 (30.9%)	2,447 (11.4%)	902 (35.8%)	642 (73.5%)
Full Medicaid	2,467 (10.3%)	1,211 (6.4%)	1,256 (25.2%)	1,706 (8.0%)	761 (30.2%)	No Data
Partial Medicaid	882 (3.7%)	596 (3.1%)	286 (5.7%)	741 (3.5%)	141 (5.6%)	No Data
No Medicaid	20,622 (86.0%)	17,179 (90.5%)	3,443 (69.1%)	19,002 (88.6%)	1,620 (64.2%)	No Data
No Medicaid, <200% FPL	5,362 (22.4%)	4,105 (21.6%)	1,257 (25.2%)	4,657 (21.7%)	705 (28.0%)	232 (26.5%)
No Medicaid, >200% FPL	15,260 (63.7%)	13,074 (68.9%)	2,186 (43.9%)	14,345 (66.9%)	915 (36.3%)	No Data
Living Arrangement						
Alone	6,157 (25.7%)	5,129 (27.0%)	1,027 (20.6%)	5,766 (26.9%)	391 (15.5%)	N/A
Spouse Only	10,876 (45.4%)	9,182 (48.4%)	1,693 (34.0%)	10,222 (47.7%)	653 (25.9%)	N/A
With Others	5,554 (23.2%)	3,948 (20.8%)	1,606 (32.2%)	4,542 (21.2%)	1,012 (40.1%)	N/A
Residential Care Facility	1,385 (5.8%)	727 (3.8%)	658 (13.2%)	919 (4.3%)	466 (18.5%)	N/A
Education						
Less than high school	4,882 (20.4%)	3,312 (17.4%)	1,569 (31.5%)	3,923 (18.3%)	959 (38.0%)	No Data
High school only	6,377 (26.6%)	5,113 (26.9%)	1,263 (25.3%)	5,737 (26.7%)	640 (25.4%)	No Data
Some college or more	12,713 (53.0%)	10,561 (55.6%)	2,152 (43.2%)	11,789 (55.0%)	923 (36.6%)	No Data
Residential Setting						
Community	22,586 (94.2%)	18,259 (96.2%)	4,327 (86.8%)	20,529 (95.7%)	2,057 (81.6%)	N/A
Residential care facility	1,385 (5.8%)	727 (3.8%)	658 (13.2%)	919 (4.3%)	466 (18.5%)	N/A

Source: 2011 National Health and Aging Trends Study

Section IV: Medicare Utilization—Hospitalization Rates and Per Capita Spending

Tables 4 and 5 provide Medicare utilization for the defined LTSS populations, broken out by a range of population characteristics of interest. Utilization data are drawn from 2011 Medicare claims linked to NHATS responses. These results are limited to respondents enrolled in fee-for-service Medicare, as this is the group for whom claims were available. Nursing home residents' data are excluded from other columns and are reported separately where available. Totals may not sum exactly due to rounding.

Table 4: Fee-for-Service Medicare Population, Hospitalization Rates

Table 4: Fee-for-Service Medicare Population, Hospitalization Rates (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	0.32 (0.30-0.35)	0.22 (0.20-0.24)	0.71 (0.60-0.81)	0.26 (0.24-0.28)	0.86 (0.70-1.02)	0.76 (0.53-0.98)
Age						
65-74	0.21 (0.18-0.24)	0.14 (0.12-0.17)	0.65 (0.46-0.85)	0.17 (0.14-0.20)	1.02 (0.51-1.53)	0.83 (0.45-1.21)
75-79	0.34 (0.28-0.40)	0.29 (0.24-0.35)	0.53 (0.33-0.73)	0.30 (0.25-0.35)	0.65 (0.35-0.95)	1.08 (0.00-2.17)
80+	0.51 (0.46-0.56)	0.35 (0.30-0.40)	0.81 (0.68-0.93)	0.41 (0.37-0.46)	0.87 (0.72-1.01)	0.68 (0.55-0.81)
Gender						
Female	0.33 (0.30-0.37)	0.23 (0.20-0.25)	0.67 (0.55-0.80)	0.27 (0.24-0.30)	0.76 (0.58-0.95)	0.76 (0.46-1.05)
Male	0.31 (0.27-0.35)	0.22 (0.18-0.25)	0.76 (0.58-0.95)	0.25 (0.21-0.29)	1.07 (0.78-1.35)	0.76 (0.51-1.02)
Number of Chronic Conditions						
0-1	0.15 (0.13-0.18)	0.12 (0.09-0.14)	0.46 (0.26-0.65)	0.12 (0.10-0.14)	0.62 (0.31-0.93)	No Data
2	0.29 (0.24-0.33)	0.22 (0.17-0.26)	0.58 (0.43-0.74)	0.25 (0.20-0.30)	0.69 (0.50-0.88)	No Data
3	0.42 (0.35-0.49)	0.32 (0.26-0.37)	0.71 (0.49-0.93)	0.35 (0.29-0.41)	0.90 (0.49-1.31)	No Data

Table 4: Fee-for-Service Medicare Population, Hospitalization Rates (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
4+	0.70 (0.56-0.84)	0.48 (0.36-0.60)	1.00 (0.76-1.24)	0.57 (0.44-0.70)	1.14 (0.82-1.47)	No Data
Medicaid Coverage						
Enrolled in Medicaid	0.58 (0.49-0.68)	0.35 (0.26-0.45)	0.77 (0.55-0.98)	0.41 (0.32-0.50)	0.92 (0.57-1.26)	0.78 (0.63-0.93)
Full Medicaid	0.58 (0.44-0.73)	0.36 (0.22-0.50)	0.80 (0.54-1.06)	0.41 (0.29-0.53)	0.97 (0.57-1.36)	No Data
Partial Medicaid	0.44 (0.32-0.55)	0.34 (0.19-0.49)	0.64 (0.37-0.92)	0.40 (0.28-0.52)	0.64 (0.21-1.07)	No Data
No Medicaid	0.29 (0.26-0.32)	0.21 (0.18-0.23)	0.68 (0.56-0.79)	0.24 (0.21-0.26)	0.83 (0.66-0.99)	0.69 (0.13-1.25)
No Medicaid, <200% FPL	0.37 (0.31-0.44)	0.27 (0.21-0.34)	0.70 (0.53-0.86)	0.31 (0.24-0.37)	0.80 (0.56-1.01)	No Data
No Medicaid, >200% FPL	0.25 (0.22-0.28)	0.19 (0.16-0.21)	0.67 (0.52-0.81)	0.22 (0.19-0.24)	0.85 (0.63-1.08)	No Data
Living Arrangement						
Alone	0.34 (0.30-0.38)	0.27 (0.22-0.32)	0.68 (0.49-0.87)	0.30 (0.26-0.34)	0.92 (0.56-1.27)	N/A
Spouse Only	0.24 (0.21-0.27)	0.17 (0.14-0.19)	0.62 (0.45-0.80)	0.20 (0.17-0.23)	0.89 (0.58-1.20)	N/A
With Others	0.40 (0.33-0.46)	0.25 (0.19-0.30)	0.77 (0.59-0.94)	0.31 (0.25-0.37)	0.77 (0.53-1.02)	N/A
Residential Care Facility	0.60 (0.46-0.74)	0.41 (0.24-0.58)	0.81 (0.57-1.05)	0.42 (0.28-0.56)	0.96 (0.65-1.26)	N/A
Education						
Less than high school	0.46 (0.38-0.54)	0.29 (0.23-0.36)	0.82 (0.64-1.00)	0.36 (0.30-0.43)	0.86 (0.62-1.11)	No Data
High school only	0.33 (0.27-0.38)	0.25 (0.20-0.29)	0.66 (0.44-0.87)	0.26 (0.22-0.31)	0.88 (0.52-1.24)	No Data
Some college or more	0.27 (0.23-0.30)	0.19 (0.16-0.21)	0.66 (0.53-0.78)	0.22 (0.19-0.25)	0.84 (0.63-1.06)	No Data

Table 4: Fee-for-Service Medicare Population, Hospitalization Rates (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Residential Setting						
Community	0.30 (0.28-0.33)	0.21 (0.19-0.24)	0.69 (0.58-0.80)	0.25 (0.23-0.28)	0.84 (0.66-1.02)	N/A
Residential care facility	0.60 (0.46-0.74)	0.41 (0.24-0.58)	0.81 (0.57-1.05)	0.42 (0.28-0.56)	0.96 (0.65-1.26)	N/A

Source: 2011 National Health and Aging Trends Study

Table 5: Fee-for-Service Medicare Population, Annual Per Capita Medicare Spending

Table 5: Fee-for-Service Medicare Population, Annual Per Capita Medicare Spending (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	\$8,507 (\$8,024- \$8,990)	\$6,332 (\$5,815- \$6,849)	\$16,792 (\$15,135- \$18,449)	\$7,127 (\$6,641- \$7,613)	\$20,248 (\$18,012- \$22,484)	\$20,298 (\$17,006- \$23,590)
Age						
65-74	\$5,914 (\$5,291- \$6,537)	\$4,559 (\$3,994- \$5,124)	\$14,674 (\$11,863- \$17,485)	\$5,283 (\$4,620- \$5,946)	\$19,458 (\$14,087- \$24,829)	\$23,334 (\$14,545- \$32,123)
75-79	\$9,554 (\$8,292- \$10,816)	\$8,040 (\$6,921- \$9,159)	\$15,654 (\$11,566- \$19,742)	\$8,610 (\$7,531- \$9,689)	\$17,661 (\$11,049- \$24,273)	\$25,485 (\$15,407- \$35,563)
80+	\$12,436 (\$11,503- \$13,369)	\$9,153 (\$8,352- \$9,954)	\$18,671 (\$16,610- \$20,732)	\$10,017 (\$9,321- \$10,713)	\$21,349 (\$18,513- \$24,185)	\$18,672 (\$15,993- \$21,351)
Gender						
Female	\$8,688 (\$8,003- \$9,373)	\$6,406 (\$5,779- \$7,033)	\$16,036 (\$14,152- \$17,920)	\$7,272 (\$6,581- \$7,963)	\$18,280 (\$15,992- \$20,568)	\$19,253 (\$15,215- \$23,291)

Table 5: Fee-for-Service Medicare Population, Annual Per Capita Medicare Spending
(95% Confidence Interval)

	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
Male	\$8,281 (\$7,523- \$9,039)	\$6,247 (\$5,502- \$6,992)	\$18,099 (\$15,052- \$21,146)	\$6,955 (\$6,278- \$7,632)	\$24,420 (\$19,356- \$29,484)	\$23,478 (\$17,256- \$29,700)
Number of Chronic Conditions						
0-1	\$4,316 (\$3,889- \$4,743)	\$3,620 (\$3,151- \$4,089)	\$10,057 (\$7,280- \$12,834)	\$3,806 (\$3,377- \$4,235)	\$12,612 (\$8,175- \$17,049)	No Data
2	\$8,160 (\$7,216- \$9,104)	\$6,568 (\$5,826- \$7,310)	\$15,034 (\$11,803- \$18,265)	\$7,157 (\$6,259- \$8,055)	\$18,436 (\$14,517- \$22,355)	No Data
3	\$11,273 (\$9,975- \$12,571)	\$8,897 (\$7,393- \$10,401)	\$17,706 (\$15,044- \$20,368)	\$9,837 (\$8,462- \$11,212)	\$20,823 (\$16,736- \$24,910)	No Data
4+	\$16,239 (\$13,867- \$18,611)	\$11,709 (\$9,525- \$13,893)	\$22,345 (\$18,103- \$26,587)	\$13,123 (\$10,955- \$15,291)	\$26,621 (\$20,136- \$33,106)	No Data
Medicaid Coverage						
Enrolled in Medicaid	\$15,075 (\$13,507- \$16,643)	\$9,770 (\$8,095- \$11,446)	\$18,698 (\$16,095- \$21,302)	\$11,206 (\$9,592- \$12,821)	\$21,137 (\$17,145- \$25,128)	\$21,298 (\$17,942- \$24,653)
Full Medicaid	\$15,081 (\$12,964- \$17,198)	\$10,760 (\$8,469- \$13,051)	\$19,245 (\$16,115- \$22,375)	\$12,063 (\$9,934- \$14,192)	\$21,843 (\$17,188- \$26,498)	No Data
Partial Medicaid	\$10,530 (\$8,641- \$12,419)	\$7,760 (\$5,588- \$9,932)	\$16,298 (\$11,184- \$21,412)	\$9,234 (\$7,147- \$11,321)	\$17,328 (\$10,202- \$24,454)	No Data
No Medicaid	\$7,744 (\$7,192- \$8,296)	\$5,971 (\$5,433- \$6,509)	\$15,938 (\$13,866- \$18,011)	\$6,602 (\$6,072- \$7,131)	\$19,753 (\$16,974- \$22,531)	\$17,527 (\$12,469- \$22,586)

Table 5: Fee-for-Service Medicare Population, Annual Per Capita Medicare Spending (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
No Medicaid, <200% FPL	\$8,738 (\$7,682- \$9,794)	\$6,684 (\$5,616- \$7,752)	\$15,447 (\$12,670- \$18,224)	\$7,096 (\$6,052- \$8,140)	\$19,585 (\$15,377- \$23,793)	No Data
No Medicaid, >200% FPL	\$7,247 (\$6,606- \$7,888)	\$5,747 (\$5,134- \$6,360)	\$16,221 (\$13,400- \$19,042)	\$6,441 (\$5,806- \$7,076)	\$19,882 (\$16,017- \$23,747)	No Data
Living Arrangement						
Alone	\$8,767 (\$7,884- \$9,650)	\$7,221 (\$6,357- \$8,085)	\$16,484 (\$13,294- \$19,674)	\$7,814 (\$7,059- \$8,569)	\$22,820 (\$16,725- \$28,915)	N/A
Spouse only	\$7,015 (\$6,376- \$7,654)	\$5,612 (\$4,985- \$6,239)	\$14,628 (\$11,871- \$17,385)	\$6,217 (\$5,566- \$6,868)	\$19,504 (\$14,387- \$24,621)	N/A
With others	\$9,351 (\$8,265- \$10,437)	\$6,094 (\$5,144- \$7,044)	\$17,354 (\$15,185- \$19,523)	\$7,399 (\$6,319- \$8,479)	\$18,104 (\$15,474- \$20,734)	N/A
Residential care facility	\$15,689 (\$12,496- \$18,882)	\$10,454 (\$7,339- \$13,569)	\$21,474 (\$16,015- \$26,933)	\$11,586 (\$8,917- \$14,255)	\$23,791 (\$16,486- \$31,096)	N/A
Education						
Less than high school	\$11,076 (\$9,725- \$12,427)	\$8,142 (\$6,801- \$9,483)	\$17,269 (\$14,738- \$19,800)	\$9,197 (\$7,829- \$10,565)	\$18,765 (\$15,524- \$22,006)	No Data
High school only	\$8,145 (\$7,165- \$9,125)	\$6,300 (\$5,557- \$7,043)	\$15,613 (\$11,984- \$19,242)	\$6,984 (\$6,097- \$7,871)	\$18,556 (\$13,627- \$23,485)	No Data
Some college or more	\$7,702 (\$7,005- \$8,399)	\$5,780 (\$5,113- \$6,447)	\$17,137 (\$14,760- \$19,514)	\$6,507 (\$5,869- \$7,145)	\$22,961 (\$19,071- \$26,851)	No Data
Residential Setting						

Table 5: Fee-for-Service Medicare Population, Annual Per Capita Medicare Spending (95% Confidence Interval)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
Community	\$8,067 (\$7,627- \$8,507)	\$6,168 (\$5,669- \$6,667)	\$16,080 (\$14,509- \$17,651)	\$6,927 (\$6,452- \$7,402)	\$19,445 (\$17,243- \$21,647)	N/A
Residential care facility	\$15,689 (\$12,496- \$18,882)	\$10,454 (\$7,339- \$13,569)	\$21,474 (\$16,015- \$26,933)	\$11,586 (\$8,917- \$14,255)	\$23,791 (\$16,486- \$31,096)	N/A

Source: 2011 National Health and Aging Trends Study

Section V: Sample Sizes

Tables 6 and 7 provide sample sizes for the analyses above. For the size of the LTSS need population and descriptive statistics, we used the full NHATS sample, which includes both Medicare Advantage and fee-for-service Medicare beneficiaries. We also provided population estimates and statistics for the Medicare fee-for-service population. For the analysis of Medicare utilization, we were limited to the Medicare fee-for-service sample, for whom linked claims data is available. Nursing home residents are excluded from other columns and are reported separately where available.

Table 6: Unweighted Sample Sizes, All NHATS Respondents

Table 6: Unweighted Sample Sizes, All NHATS Respondents						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	7,609	5,712	1,897	6,585	1,024	468
Age						
65-74	2,988	2,531	457	2,844	144	39
75-79	1,513	1,188	325	1,348	165	56
80+	3,108	1,993	1,115	2,393	715	373
Gender						
Female	4,438	3,186	1,252	3,726	712	354

Table 6: Unweighted Sample Sizes, All NHATS Respondents

	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Male	3,171	2,526	645	2,859	312	114
Number of Chronic Conditions						
0-1	2,422	2,102	320	2,236	186	No Data
2	2,342	1,826	516	2,082	260	No Data
3	1,781	1,210	571	1,494	287	No Data
4+	1,064	574	490	773	291	No Data
Medicaid Coverage						
Enrolled in Medicaid	1,354	697	657	939	415	365
Full Medicaid	941	436	505	606	335	No Data
Partial Medicaid	413	261	152	333	80	No Data
No Medicaid	6,255	5,015	1,240	5,646	609	103
No Medicaid, <200% FPL	2,068	1,521	547	1,760	308	No Data
No Medicaid, >200% FPL	4,187	3,494	693	3,886	301	No Data
Living Arrangement						
Alone	2,139	1,714	425	1,968	171	N/A
Spouse Only	2,977	2,439	538	2,742	235	N/A
With Others	2,081	1,334	747	1,587	494	N/A
Residential Care Facility	412	225	187	288	124	N/A
Education						
Less than high school	2,047	1,310	737	1,591	456	No Data
High school only	2,069	1,609	460	1,821	248	No Data
Some college or more	3,493	2,793	700	3,173	320	No Data
Residential Setting						
Community	7,197	5,487	1,710	6,297	900	N/A
Residential care facility	412	225	187	288	124	N/A

Source: 2011 National Health and Aging Trends Study

Table 7: Unweighted Sample Sizes, Fee-for-Service Medicare Enrollees

Table 7: Unweighted Sample Sizes, Fee-for-Service Medicare Enrollees (NHATS Respondents with Linked Claims Data)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Total Population	5,077	3,781	1,296	4,351	726	384
Age						
65-74	1,935	1,653	282	1,835	100	32
75-79	981	765	216	863	118	45
80+	2,161	1,363	798	1,653	508	307
Gender						
Female	2,905	2,063	842	2,400	505	298
Male	2,172	1,718	454	1,951	221	86
Number of Chronic Conditions						
0-1	1,617	1,396	221	1,485	132	No Data
2	1,545	1,192	353	1,359	186	No Data
3	1,194	803	391	986	208	No Data
4+	721	390	331	521	200	No Data
Medicaid Coverage						
Enrolled in Medicaid	875	432	443	581	294	298
Full Medicaid	653	287	366	406	247	No Data
Partial Medicaid	222	145	77	175	47	No Data
No Medicaid	4,202	3,349	853	3,770	432	86
No Medicaid, <200% FPL	1,316	955	361	1,105	211	No Data
No Medicaid, >200% FPL	2,886	2,394	492	2,665	221	No Data
Living Arrangement						
Alone	1,457	1,164	293	1,329	128	N/A
Spouse Only	1,991	1,619	372	1,827	164	N/A
With Others	1,343	847	496	1,002	341	N/A
Residential Care Facility	286	151	135	193	93	N/A
Education						
Less than high school	1,309	816	493	984	325	No Data
High school only	1,342	1,038	304	1,173	170	No Data

Table 7: Unweighted Sample Sizes, Fee-for-Service Medicare Enrollees (NHATS Respondents with Linked Claims Data)						
	All Community Residents	Broad Definition of Need		Narrow Definition of Need		Nursing Home Residents
		No Need	LTSS Need	No Need	LTSS Need	
Some college or more	2,426	1,927	499	2,195	231	No Data
Residential Setting						
Community	4,791	3,630	1,161	4,158	633	N/A
Residential care facility	286	151	135	193	93	N/A

Source: 2011 National Health and Aging Trends Study

Section VI: Proportion of Total Medicare Utilization by Different Groups

Tables 8 and 9 offer a different analysis of Medicare utilization and show how different definitions of high-cost, high-need populations account for different proportions of overall Medicare hospitalizations and spending. Table 8 presents the share of total hospitalizations and spending attributable to Medicare fee-for-service beneficiaries who need LTSS, the dually eligible, and those with multiple chronic conditions. Table 8 excludes nursing home residents, for whom chronic condition data is not available. Table 9 presents the same information including nursing home residents. Totals may not sum exactly due to rounding.

Table 8: Share of Total Medicare Utilization by Different Groups, Excluding Nursing Home Residents

Table 8: Share of Total Medicare Utilization by Different Groups, Excluding Nursing Home Residents Fee-for-Service Medicare Beneficiaries						
Group	Size of Group (Population)	Share of Population	Group's Hospitalizations	Share of Hospitalizations	Group's Medicare Spending	Share of Medicare Spending
All fee-for-service beneficiaries	24.0 million	100%	7.3 million	100%	\$203.9 billion	100%
Broad Definition of LTSS Need						
LTSS Need in the Community	5.0 million	20.8%	3.2 million	43.8%	\$83.7 billion	41.0%
No Need	19.0 million	79.2%	4.1 million	56.2%	\$120.2 billion	59.0%
Narrow Definition of LTSS Need						
LTSS Need in the Community	2.5 million	10.4%	2.0 million	27.4%	\$51.1 billion	25.1%
No Need	21.5 million	89.6%	5.3 million	72.6%	\$152.8 billion	74.9%

Medicaid Status						
Medicaid	3.3 million	13.8%	1.7 million	23.3 %	\$46.5 billion	22.8%
No Medicaid	20.6 million	85.8%	5.6 million	76.7%	\$157.4 billion	77.2%
Chronic Conditions						
0-1	8.6 million	35.8%	1.3 million	17.8%	\$36.9 billion	18.1%
2	7.1 million	29.6%	2.0 million	27.4%	\$57.9 billion	28.4%
3	5.2 million	21.7%	2.1 million	28.8%	\$59.2 billion	29.0%
4+	3.1 million	12.9%	2.0 million	27.4%	\$50.0 billion	24.5%

Source: 2011 National Health and Aging Trends Study

Table 9: Share of Total Medicare Utilization by Different Groups, Including Nursing Home Residents

Table 9: Share of Total Medicare Utilization by Different Groups, Including Nursing Home Residents Fee-for-Service Medicare Beneficiaries						
Group	Size of Group (Population)	Share of Population	Group's Hospitalizations	Share of Hospitalizations	Group's Medicare Spending	Share of Medicare Spending
All fee-for-service beneficiaries	24.8 million	100%	7.9 million	100%	\$221.7 billion	100%
Broad Definition of LTSS Need						
LTSS Need in the Community	5.0 million	20.2%	3.2 million	40.5%	\$83.7 billion	37.8%
No Need	19.0 million	76.6%	4.1 million	51.9%	\$120.2 billion	54.2%
Nursing Home Residents	0.9 million	3.6%	0.6 million	7.6%	\$17.7 billion	8.0%
Narrow Definition of LTSS Need						
LTSS Need	2.5 million	10.1%	2.0 million	25.3%	\$51.1 billion	23.0%
No Need	21.5 million	86.7%	5.3 million	67.1%	\$152.8 billion	68.9%
Nursing home residents	0.9 million	3.6%	0.6 million	7.6%	\$17.7 billion	8.0%
Medicaid Status						
Medicaid	4.0 million	16.1%	2.2 million	27.8%	\$60.2 billion	27.2%
No Medicaid	20.9 million	84.3%	5.8 million	73.4%	\$161.5 billion	72.8%

Source: 2011 National Health and Aging Trends Study

Section VII: Mutually Exclusive Levels of LTSS Need

For the primary analyses in this report, we created two binary definitions of LTSS need (a narrow and broad definition) to facilitate creating cross-tables with other variables of interest (e.g., chronic conditions, dual eligibility). However, both physical and cognitive impairment exist along a continuum, and lesser or greater degrees of impairment can be found in the NHATS data. Tables 10 and 11 provide hospitalization rates and per capita Medicare spending for fee-for-service Medicare beneficiaries along this continuum. Table 10 provides utilization for four mutually exclusive levels of physical impairment, and Table 11 provides utilization for three mutually exclusive levels of cognitive impairment. Outcomes for nursing home residents are reported separately, because NHATS does not include detailed survey information on physical or cognitive impairment for these individuals.

Table 10: Medicare Utilization and Physical Impairment

Table 10: Medicare Utilization and Physical Impairment Medicare Fee-For-Service Beneficiaries			
ADL Limitations	Population Size (Share)	Hospitalization Rate (95% C.I.)	Annual Per Capita Medicare Spending (95% C.I.)
No Help or Difficulty for any ADL	16.5 million (66.5%)	0.14 (0.13-0.16)	\$4,199 (\$3,750-\$4,648)
No Help, Difficulty with 1+ ADLs	4.2 million (16.9%)	0.29 (0.24-0.34)	\$7,406 (\$6,196-\$8,616)
Help for 1-2 ADLs	2.2 million (8.9%)	0.49 (0.39-0.59)	\$11,484 (\$9,917-\$13,051)
Help for 3+ ADLs	1.2 million (4.8%)	0.75 (0.55-0.96)	\$19,694 (\$17,175-\$22,213)
Nursing Home Resident	0.9 million (3.6%)	0.76 (0.53-0.98)	\$20,298 (\$17,006-\$23,590)

Source: 2011 National Health and Aging Trends Study

Table 11: Medicare Utilization and Cognitive Impairment

Table 11: Medicare Utilization and Cognitive Impairment Medicare Fee-for-Service Beneficiaries			
Degree of Cognitive Impairment	Population Size (Share)	Hospitalization Rate (95% C.I.)	Annual Per Capita Medicare Spending (95% C.I.)
No Cognitive Impairment	21.5 million (86.7%)	0.28 (0.26-0.31)	\$7,717 (\$7,237-8,196)
Mild Cognitive Impairment (Dementia, 0 ADLs, 0-2 IADLs)	0.9 million (3.6%)	0.45 (0.35-0.56)	\$10,700 (\$8,703-\$12,697)
Severe Cognitive Impairment (Dementia, 3+ IADLs OR 1+ ADLs)	1.5 million (6.0%)	0.76 (0.61-0.91)	\$18,219 (\$15,595-\$20,844)
Nursing Home Resident	0.9 million (3.6%)	0.76 (0.53-0.98)	\$20,298 (\$17,006-\$23,590)

Source: 2011 National Health and Aging Trends Study

Section VIII: NHATS Variable Definitions

This section provides details on how variables were defined for this analysis.

Population Definition

- Broad Definition of LTSS Need
 - Assigned if difficulty with 2+ ADLs or help with 1+ ADL or (help with 3+ IADLS and probable dementia) was reported.
 - Limited to respondents living in the community (i.e., excludes nursing home residents).
- Narrow Definition of Need
 - Assigned if help with 2+ ADLs or (help with 1 ADL and probable dementia) or (help with 3+ IADLS and probable dementia) was reported.
 - Limited to respondents living in the community (i.e., excludes nursing home residents).
- Nursing Home Residents
 - Residential setting was determined using derived variable r1dresid (community dwelling= 1 or 2; nursing home = 4).

- Definition Components
 - “ADL help” was defined by a report of receiving help with transferring, eating, dressing, bathing, or toileting in the last 30 days; “ADL difficulty” was defined by a report of doing above-listed activities by oneself and experiencing difficulty in the last 30 days.
 - “IADL help” was defined by self- or proxy report of receiving help with laundry, grocery shopping, preparing meals, bills and finances, and medications and/or injections for health and functioning reasons in the last 30 days.
 - Cognitive impairment was measured based on “probable dementia” using [the publicly available NHATS dementia classification code](#).

Respondent Characteristics

- Chronic conditions
 - Number of chronic conditions were based on a count of self/proxy report of: (1) hearing loss (can’t hear phone), (2) vision impairment (can’t read newspaper), and being told by a doctor that respondent has: (3) coronary disease, (4) hypertension, (5) diabetes, (6) cancer, (7) lung disease, (8) arthritis.
- Medicaid enrollment
 - Medicaid enrollment was flagged if the MBSF Part D component showed the dual eligibility indicator in the survey month or anytime in the following 11 months, or if there was report of Medicaid enrollment (community), or a report of the person’s facility receiving payment from Medicaid (nursing home).
 - Both full-benefit and partial-benefit duals were classified as being enrolled in Medicaid. Full benefit was defined by values of 02, 04, or 08 for a given month, and partial benefit was defined by values of 01, 03, 05, or 06 for a given month.
 - Due to sample size and privacy constraints, it is not possible to report outcomes separately for nursing home residents with partial Medicaid.
- Income
 - Income information is not available for nursing home residents.

Outcomes

- Population
 - Medicare Advantage was flagged if the MBSF HMO indicator showed HMO enrollment in the survey month or the following 11 months. Outcomes were only examined for participants with no evidence of Medicare Advantage.
 - Death was flagged if the date of death variable from the MBSF indicated a date of death within 365 days of the first day of the survey month.

- Hospitalization rate
 - Each distinct claim admission date in the Medicare inpatient file that occurred within 365 days of the first day of the survey month was counted as a hospitalization.
 - Hospitalization rate was computed as (# hospitalizations/ # days survived in period) * 365.
- Total hospitalizations
 - Total hospitalizations are not adjusted for death.
- Medicare spending
 - Total annual Medicare expenditures were computed by summing the payment amount from the inpatient, outpatient, carrier, SNF, home health, hospice, and DME files for all claims in which the through date occurred within 365 days of the 1st of the month of the beneficiary's 2011 NHATS survey month. Expenditures were only computed for beneficiaries that were not enrolled in Medicare Advantage at any point in the 12 months following their NHATS survey (68.3% of our weighted analytic sample).
 - The weighted estimated total of Medicare expenditures for 24.8 million fee-for-service beneficiaries in the calendar year following the 2011 NHATS interview is \$221 billion. This weighted estimate excludes Medicare spending on Part D as well as spending on behalf of beneficiaries enrolled in Medicare Advantage, beneficiaries less than 65 years of age, and beneficiaries who became eligible for Medicare on the basis of age during the 12 months following the date of the 2011 NHATS interview. Finally, the 2011 sample for NHATS was drawn from Medicare enrollment files in October 2010. As there is a gap of between 7 and 13 months between sampling and the NHATS interview, there is some attrition due to deaths. Consequently, the sample that is interviewed (and for which Medicare expenditures are computed) represents a slightly smaller and older population than the Medicare frame.